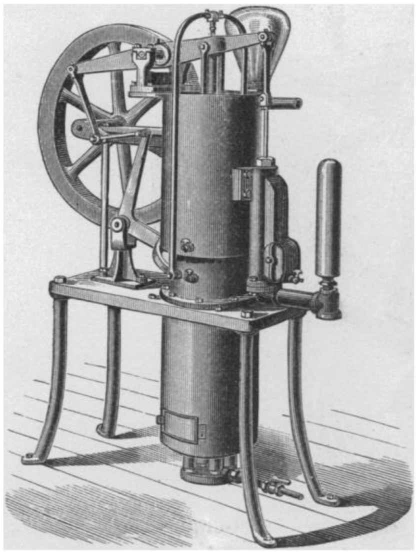
America in 1839, we have to thank the English Admiralty. In 1837 he built a tug, having two propellers of 5¼ feet diameter, invited the British Admiralty to inspect it, and towed their barge at a rapid rate; but their lordships solemnly concluded, that, as the motive power was in the stern, the novel craft would not steer. Thus it was in America, in 1841, that he began to build the "Princeton," the first naval vessel that ever carried her machinery under the water-line, out of the reach of hostile shot.



ERICSSON'S CALORIC ENGINE FOR DOMESTIC PURPOSES.

In 1839 Congress had authorized the construction of three war-ships. In 1840 the secretary of the navy, in obedience to that law, ordered two to be constructed. The question of whether steam could or could not be successfully applied to war-vessels had not then been solved, the fear of danger from ignition by fire prevailing in the minds of all naval men. One of the officers of our navy, Capt. William Hunter, submitted a plan by which wheels were to be inserted in the bilge of the vessel on each side, — submerged wheels. Ericsson had demonstrated his plan to be feasible, in his experiments in England. The secretary of the navy, in authorizing the construction of these two vessels, directed that one was to be built on Ericsson's plan, and one on Hunter's plan. Hunter's plan proved a total failure: Ericsson's plan laid the foundation of the present steam marine. The "Princeton" was the first war-propeller ever built on the face of the earth, and in her he brought forward not only his propeller, but a great many appliances appurtenant to steam navigation which have since been used in our service.

The honor of having built the first practical screw-steamer was thus Ericsson's, — an invention which was matched by that of the "Monitor," fifteen or twenty years later.

Such a device was offered by Ericsson in 1854 to Napoleon III. The story of what happened in 1862 is too well known to need repetition here. By extraordinary energy and executive skill, the "Monitor" was launched, with steam-machinery complete, a hundred days from the laying of the keel plate, and arrived in Hampton Roads just in time to defeat, March 9, 1862, the Confederate ironclad "Merrimac," which had destroyed the "Cumberland" and "Congress," and was about to sink or disperse the rest of the government's wooden fleet. Naval warfare was revolutionized.

The Mechanics' Institute of New York offered its great gold medal in January, 1840, as a prize for the best plan of a steam fire-engine. Ericsson, having several years previously designed such machines in England, among which may be mentioned the steam fire-engine employed during the memorable fire at the Argyle Rooms in London in 1830 (the first time fire had ever been extinguished by the mechanical power called forth by fire), had no difficulty in producing plans complying with the conditions of the Mechanics' Institute in a manner warranting the award of the prize offered.

His caloric engine was produced in 1833. In 1853, a voyage of the caloric ship "Ericsson," a vessel of 2,000 tons, 260 feet long, from New York to Washington and back, showed, that, though economical in fuel, the new heated-air motor could not produce speed enough at sea for commercial purposes, nor compete on any large scale with steam. Still, it has been applied successfully in thousands of engines to minor useful purposes.

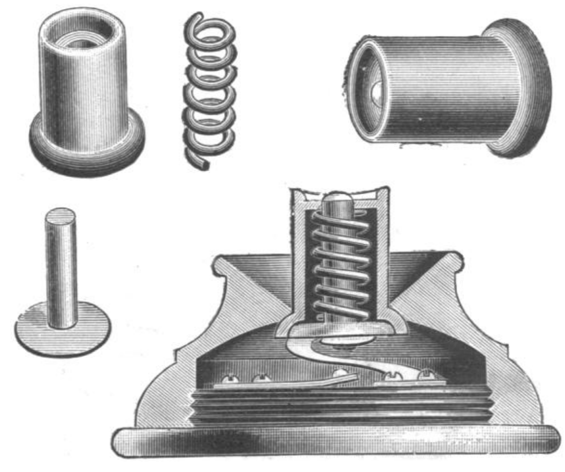
Favored by the possession of a robust constitution and ample means, Ericsson devoted many of his last years exclusively to the investigation of solar heat, and to the determination of the mechanical energy which the sun has in store for mankind when the coal-fields become exhausted. A sun-motor (illustrated in *Nature*, xxix. p. 217) erected in 1883 was found to develop under ordinary sunshine a steady and reliable power. Although he was eighty-six years old, and by no means well since the beginning of the year, Capt. Ericsson continued to labor at this motor until within two weeks of his death; and, as he saw his end approaching, he expressed regret only because he could not live to give this invention to the world in completed form. It occupied his thoughts up to his last hour. While he could hardly speak above a whisper, he drew his chief engineer's face close to his own, gave him final instructions for continuing the work on the machine, and exacted a promise that the work should go on.

No visitor was allowed to enter his workshop. Even his most intimate friends have never gained entrance there. Nor has any servant been in the room where the captain spent more than twelve hours daily for thirty years.

Here in his workshop, as it were, Ericsson lived, and here he died, a recognized leader among those who have added to human welfare, and honoring by his name the rolls of more than a score of associations of learned men.

THE DENIO FIRE-ALARM.

WE illustrate herewith a simple automatic fire-alarm combined with an ordinary electric push-button, which is being manufactured by the Denio Fire Alarm Company of Rochester, N.Y. The construction and operation of the device will be readily understood from the following description. In a thimble with an internal flange at one end, an external hollowed flange at the other, is placed



DENIO'S FIRE-ALARM.

a spring slightly longer than the thimble. This spring, one end of which bears against the internal flange, is compressed, and held in place by a pin which passes through it, the head of the pin fitting snugly in the recess made in the external flange of the thimble. The pin is sufficiently long to project entirely through the orifice in the internal flange end of the thimble. When the parts have been put together, the pin is secured in place by soldering to the flange, the solder used for this purpose being an alloy which will fuse at a low temperature, 150° to 160° F.

By removing the porcelain knob from any of the ordinary push-buttons now in use, and substituting this thimble, the button is

converted into an automatic fire-alarm, without in any way interfering with its use as a call. Pressure upon the thimble causes electric contact between the springs in the base of the button-fixture, in the usual manner, completing the circuit and ringing the bell.

As a fire-alarm, it operates as follows: When the heat of any room in which this attachment has been placed reaches a predetermined temperature, the alloy melts, and releases the pin, which is forced out of the thimble by the expansion of the spring. The springs in the fixture are then brought into continuous contact by the pressure of the pin, the circuit is thereby closed, and the alarm transmitted to a central station, where measures can immediately be adopted for extinguishing the fire. The device is applicable to open or closed circuit, and to all purposes for which a thermostat is required. It is an efficient substitute for the more complicated and expensive thermostats, and should be very reliable, as the wires and connections are constantly being tested.

AN IMPROVED ELECTRIC SYSTEM.

THE Sperry system of electric lighting, which has been widely introduced, especially in the Western States, has recently been considerably improved. The dynamo as now made is shown in Fig. 1. A special feature of this is the automatic regulator. The brushes consist of overlapping flat copper strips attached to a movable yoke. This yoke is connected by means of an arm to an electro-magnetic regulator placed in the lamp-circuit. Any variation in the electrical resistance of the lamp-circuit operates the keeper of the electro-magnet. By an ingenious device, this movement adjusts the current of the dynamo in proportion to any variation in the resistance of the lamp-circuit. The manufacturer claims that all of the lights, a single light, or any number from zero to full capacity, may be extinguished without danger to the dynamo, and without the presence or knowledge of the dynamo-tender or engineer.

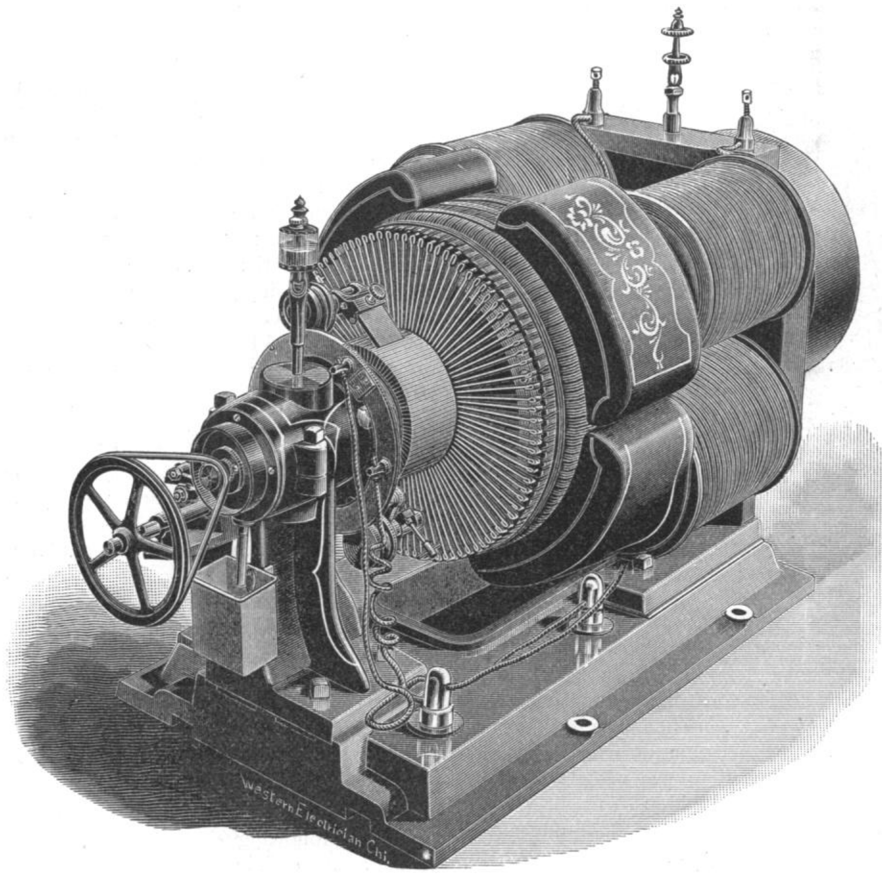
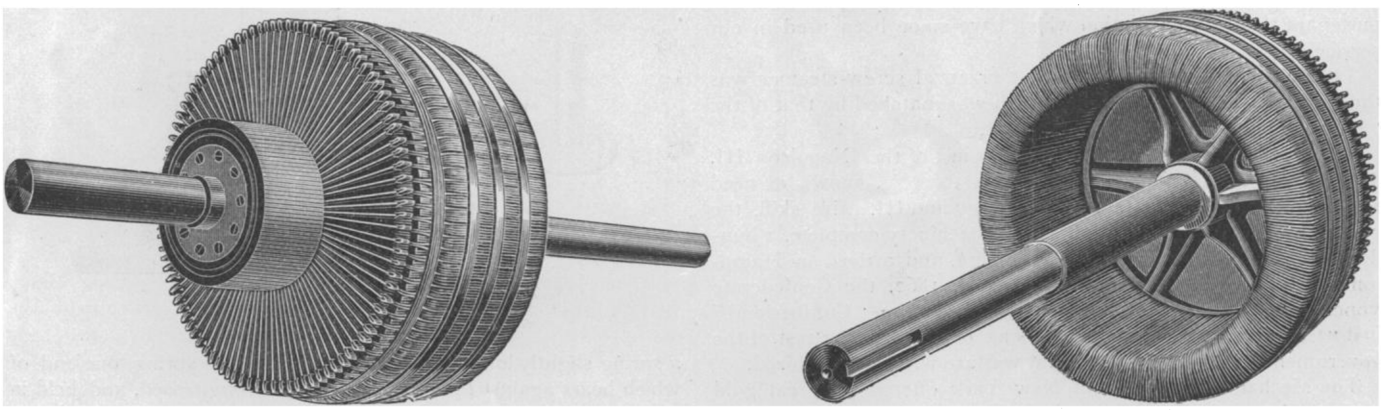


FIG. 1. — SPERRY DYNAMO COMPLETE.



FIGS. 2 AND 3. — ARMATURE OF SPERRY DYNAMO.